

✓
January, 1941

1941
Circular 405

Diseases of Roses

P. P. PIRONE

New Jersey Agricultural Experiment Station
Rutgers University
New Brunswick, New Jersey

✓

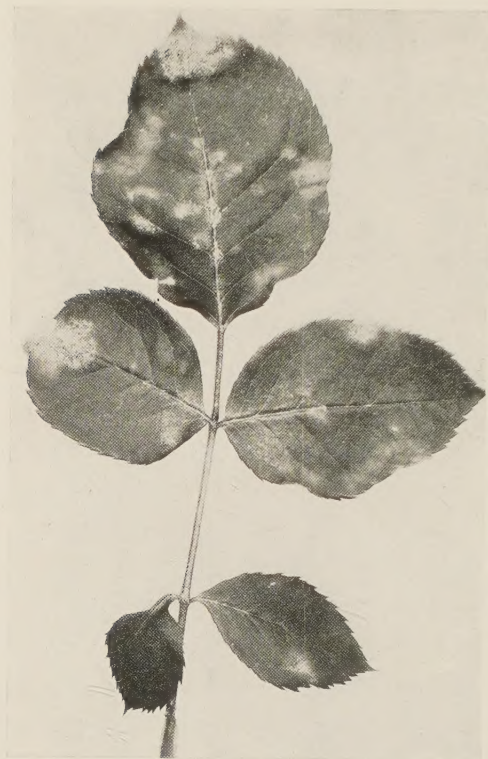


(Photo by J. Horace McFarland Co.)

A MAGNIFICENT REWARD FOR SUCCESS IN THE WAR ON DISEASES

CONTENTS

	Page
Mildew	5
Black Spot	5
Rusts	6
Mosaic	6
Leaf Spots	7
Brown Canker	7
Common Cane Canker and Graft Canker	9
Brand Canker	9
Crown Canker	10
Crown Gall	11



Rose Mildew



Black Spot of Rose on Leaves



Crown Gall of Rose
Developing on Cut
Flower Stalk



Black Spot
on Canes
of Los
Angeles Rose

Diseases of Roses

P. P. PIRONE, *Associate Plant Pathologist*

Mildew (*Sphaerotheca pannosa* [Wallr.] Lev. *rosae* Wor.) is prevalent wherever roses are grown, and is especially severe on certain varieties of hybrid teas, climbers, and ramblers. On the young leaves, infections first show as raised, blisterlike areas. On older leaves little distortion of the foliage occurs. The infected areas soon become covered with a white, powdery fungus growth, composed largely of colorless spores. On young growing tips, the leaves may be completely covered with the mildew, causing dwarfing and distortion. Infections may also occur on the thorns, stems, and bloom stalks, where usually a swelling of the infected areas takes place. In outdoor gardens, mildew is usually not serious until late summer. Under greenhouse conditions, it becomes extremely severe only in spring when it becomes more difficult to maintain the proper temperatures and humidities.

CONTROL.—Mildew may be controlled outdoors by weekly applications of dusting sulfur. In greenhouses, painting the steam pipes with a paste composed of equal parts of sulfur and lime mixed with water will hold mildew in check until spring. The use of sulfur vaporizers is also of benefit. Careful management of the greenhouse by avoiding excessive ventilation, excessive syringing, and sudden changes in temperature also helps.

Black Spot (*Diplocarpon rosae* Wolf), like mildew, is as widely distributed as the rose. All families of roses are susceptible to this disease, although varying degrees of resistance and susceptibility have been observed. It is the most serious leaf disease of the rose.

Black, irregularly circular spots with a radiating or "feathery" margin occur on the leaves. Several spots may occur on a single leaf; the tissue between the spots turns yellow, and the leaf falls prematurely. A new set of leaves is produced, and the new growth takes place in late summer and in early fall. As a result, the plant is weakened, and the wood is improperly matured. Such plants are especially subject to winter injury and to losses in storage or in forcing. Defoliated plants produce fewer blossoms the following year.

Cane infections may occur on the tender immature wood, especially on soft-wooded varieties such as Los Angeles, Golden Emblem, Wm. F. Dreer, Mme. Edouard Herriot, and Beauté de Lyon. These infections appear as purplish-red, raised, irregular blotches.

CONTROL.—The fungus responsible for black spot overwinters in the infected fallen leaves and in the infected areas on the canes. Adequate control

measures, therefore, should include strict attention to sanitation. All fallen leaves should be carefully raked up and burned in the fall. Canes should be cut back to three or four buds in the spring. Weekly applications of finely ground sulfur dust will hold the disease in check. Flowers of sulfur should not be used, since it is too coarse. Best control is obtained when all growing parts are thoroughly covered with a light coating of dust, and when the dusts are applied before, rather than after, a rainy spell. The addition of 1 part of arsenate of lead to 9 parts of sulfur not only increases the fungicidal value of the sulfur but also serves as a poison for chewing insects. Many proprietary compounds are available which give good black spot control.

Greenhouse control is largely effected by proper greenhouse management especially preventing excessive and rapid changes in temperature. Excessive syringing for red spider control increases the prevalence of black spot. Sulfur-lime paste on the steam pipes as recommended for mildew control, and dusting with sulfur are partially effective. Applications of sulfur fungicides during the summer result in clean plants with which to start the forcing season, but because of discoloration of foliage and bleaching of flowers these cannot be used after flower cutting begins.

Rusts (*Phragmidium* spp.).—Rust of roses is not so common as mildew or black spot but is destructive wherever found. The rust disease can be readily recognized by the orange-brown powdery spore masses on the under surface of the leaves. Later in the season the spore pustules become darker brown because of the production of winter spores. Young canes may also be infected, distortion or bending frequently resulting from such infection.

CONTROL.—In controlling this disease, all fallen leaves should be gathered and burned in the fall, since the fungus overwinters in the infected leaves. A dormant spray of lime sulfur 1-9, severe spring pruning, and weekly applications of dusting sulfur during the growing season will afford a practical control.

Mosaic (Virus).—Rose mosaic is a disease of rather recent origin found mainly on greenhouse roses in the eastern United States. Hybrid Tea varieties are most markedly dwarfed by mosaic infection. The degree of dwarfing depends on the variety, severity of infection, and environmental conditions. Hybrid Perpetual varieties and species are not markedly dwarfed.

Blooms are produced on shortened stems, and many of the buds are imperfect. The foliage is generally distorted, and the leaflets show distinct chlorotic areas, especially along the midrib and main veins. These chlorotic areas cause the leaflets to pucker and ruffle.

Rose mosaic is perpetuated by budding on diseased understocks or by using infected scion or bud wood on healthy understocks. The disease is present in all the large rose-producing areas in the United States.

CONTROL.—Mosaic can be excluded from the greenhouse by using understock grown in a region free from the disease.

Leaf Spots (*Cercospora rosicola* Pass., *Sphaceloma rosarum* [Pass.] Jenkins).—Leaf spots caused by the *Cercospora* and *Sphaceloma* fungi are common, especially on climbing roses, and in severe cases cause defoliation.

CONTROL.—The control measures recommended for black spot, if rigidly adhered to, will hold these diseases in check sufficiently so that they will cause no serious trouble.

Brown Canker (*Cryptosporella umbrina* Jenkins) is the most important disease of the canes of roses. The Teas, Hybrid Teas, and Hybrid Perpetuals, in the order named, are particularly susceptible; whereas the Briers, Rugosas, Mosses, most of the species, and some of the ramblers appear to be less frequently affected.

During the growing season, on the young canes, small, at first water-soaked, circular, red spots appear, which later become white. These do not enlarge during the summer and are limited to the outer bark of the stem. In late winter and spring, these spots enlarge, forming a cinnamon-buff, oval canker. Such cankers frequently girdle the stem, causing the death of the distal portions of the cane. Infection gradually works down the cane, causing a condition often attributed to winter injury. The surface of these cankered areas is thickly dotted with minute, slightly protruding, black bodies, the fruiting structures of the pathogen. A spotting of the foliage is also a symptom of this disease. Spots appear as small purple or purplish brown, circular areas, or they may involve larger areas of the leaf. Infections are very common on leaves below infected blooms, upon which sporulation is abundant.

This disease is one of the causes of "balled" blooms. The outer petals, which in many instances are infected, become brown, showing a marked zonate arrangement of the dark brown fruiting bodies. Blooms infected early in the development of the bud fail to open. The bloom stalks may



Brown Canker Infections on Leaves



Left: Initial Infection Lesions of Brown Canker of Rose
Center: Later Stage of Brown Canker of Rose
Right: Common Cane Canker of Rose

become infected from diseased buds or directly, as do the canes. Canes may then gradually die-back, giving rise to the die-back type of the trouble, which is common on the more susceptible varieties.

CONTROL.—No plants bearing brown canker lesions should be introduced into gardens free from the disease. If the disease is known to be present in the garden, heavy pruning should be practiced in spring, to remove the canes that may carry the small white lesions and the larger cankers. As infected stems appear during the season, they should be immediately pruned out, being cut several inches below the lower limit of the lesions, and burned. These practices should be supplemented by sulfur applications as recom-

mended for black spot and mildew. In addition to the summer applications, it is suggested that the plants be given a dormant spray of lime-sulfur (1 part of concentrated lime sulfur in 9 parts of water) in the fall and again before the buds open in the spring.

Common Cane Canker and Graft Canker (*Leptosphaeria coniothyrium* [Fckl.] = *Coniothyrium fuckelii* Sacc.) is the cause of many dead canes and plants outdoors. It is more prevalent on Hybrid Tea roses than on other kinds. Pale yellow or red spots occur on the bark, and as the infected area increases in size the color becomes brown. Small black pin-point structures, the fruiting bodies of the fungus, are produced abundantly on the cankered area. Cankers frequently girdle the canes, causing the death of the distal portions.

In many instances, high percentages of grafts are lost immediately after grafting, while the plants are in the frames for callusing. Dark brown lesions occur at the base of the scion where it joins the stock. These rapidly spread over the surface of the entire scion and cause its sudden death. The wood of *Rosa manetti* stock is seldom attacked, this species being highly resistant.

Grafts may show only slight infection upon removal from the callusing frames, and with the lower humidity and harder growth of the plant, invasion of the fungus is checked. Cankers may then develop on one side of the graft, giving weak, one-sided plants. Such cankers may eventually girdle the stem at the base, causing the sudden wilting and death of the entire plant. Infection also takes place through cut ends of the canes caused by pruning or cutting of blooms. On some varieties these cankers may progress down the canes to the base, ultimately causing the death of the entire plant, but on other varieties the cankers are checked at the base of the branch.

CONTROL.—Prompt removal of infected canes, cutting well back of the cankered areas, heavy spring prunings, and a dormant spray of lime-sulfur as recommended for black spot and brown canker control, are all that can be recommended for outdoor roses. Infection of newly made grafts can be lessened by selection of scion wood from houses free from this disease. If such are not available, disease-free plants should be selected for bud and scion material.

Brand Canker (*Coniothyrium wernsdorffiae* Laub.), as far as is known, is limited to New York, Texas, Pennsylvania, and Minnesota in the United States, and is largely confined in its attacks to rambler roses. Nearly 90 per cent of the plants in one planting have been observed to be affected. The cankers are brown, with a reddish brown or purplish margin. The bark in the center of the cankers cracks open by small longitudinal slits. The fruit bodies appear as small black points in the brown canker. This canker may be distinguished from common cane canker by the reddish or purplish margin and by the small longitudinal cracks, and from brown canker by its host limitations and the darker brown of the cankered area.

CONTROL.—Applications of summer and dormant fungicides are of no help. Thorough pruning of infected canes aids in keeping the disease in check. Brand canker is seldom present on roses which are not covered or protected during the winter.



Crown Canker of Rose

Crown Canker (*Cylindrocladium scoparium* Morg.) is confined in its attacks to greenhouse roses, and infects grafted, budded, or own-root plants. The union of the scion and stock, and the area immediately above, are the most common points of attack.

A slight discoloration of the bark soon darkens into a black, water-soaked, punky, cankered area. Lesions often girdle the cane or plant, but they do not cause their sudden death, as is the case with the cankers previously described. Infected plants fail to respond to forcing treatments and, as compared with healthy plants, produce fewer blooms of an inferior quality. Abundant moisture is a very important factor with this disease, which undoubtedly accounts for its absence on outdoor roses.

Infections occur on stubs left by cutting blooms or through wounds on any part of the cane. These cankers may extend down the cane.

CONTROL.—Control measures are confined to preventive methods. If the disease is already present in a house, the soil should be changed or sterilized before it is replanted with new stock. The benches should also be thoroughly cleaned and sterilized with a formaldehyde or corrosive sublimate wash before they are refilled. Potting soil should be sterilized. If old pots are being used, they should be disinfected. Special care should be taken to avoid bringing infected soil, on tools or by other means, into houses free from the trouble.

Crown Gall (*Phytoplasma tumefaciens* [Sm. & Townsend] Bergey et al.), a bacterial disease causing gall-like growths at the crown and on aerial parts of roses, is very common. On outdoor roses, galls are usually limited to the underground portions of the plant, occurring at the crown or at the union of the graft and scion, or less frequently at the union of a side root with the main root. Infected plants are dwarfed, produce few blooms, and lack vitality. This disease rarely, if ever, kills the plant.

In the greenhouse, galls may also occur on aerial portions of the plant, infection taking place through wounds made by cutting blooms. Aerial galls are particularly common on Ophelia, Rapture, and Butterfly varieties. Other common greenhouse varieties such as Templar, Premier, Killarney, Matchless, Briarcliff, and Pernet rarely show aerial galls. Although fairly abundant, this disease is of little economic importance in the greenhouse, because of the artificially controlled growing conditions.

CONTROL.—The best control is to remove diseased plants, drench the surrounding soil with corrosive sublimate solution 1-1000, and replace the diseased individual with a healthy one. This solution should be used with caution, since mercury vapors released during soil treatment may be injurious to nearby healthy roses. Crown gall tumors on some plants may be inhibited or killed by brushing with a 2 per cent colchicine solution.

